NORTHERN TERRITORY FISHES.

An annotated list of fishes collected from the waters of the Northern Territory of Australia during the cruises of H.M.A.S. "Geranium," 1923-1925.

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Plates XI.–XV., and Text-figures 1–3.

INTRODUCTION.

The fishes comprising this collection were obtained by one of us †(W.E.J.P.) during the winter months of 1923 and 1924, and by the succeeding Medical Officer (Surgeon Lieutenant K. E. F. D. Hudson, R.A.N.) in 1925.

The generic and specific identification of the "Geranium" collection was the work of our esteemed friend, the late Mr. A. R. McCulloch, and his assistant (the junior author), who has now succeeded him.

The notes were made at the time of capture of the specimens by the senior author, who has also figured and described the new species appearing in the collection.

In preparing this list, we have made great use of "A List of the Fishes Recorded from Queensland Waters," by A. R. McCulloch and G. P. Whitley, published in Memoirs of the Queensland Museum, Vol. VIII., Part II., to which the reader is referred for references to literature, hoping that our list will to some degree serve as supplement to the former publication.

The majority of the fish mentioned in our list appear in the former publication, and we feel sure that those fish mentioned by us, which were collected at Sir Edward Pellew Group (our main collecting ground), and have not so far been recorded from Queensland waters, will in time be collected from there, as these islands are situated in the Gulf of Carpentaria only a few miles from the Queensland border.

The other localities from which fish were collected were Cape Wessel and Port Darwin, and fish from these localities might reasonably be expected to occur at least occasionally in Queensland waters.

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* By permission of the Director of Naval Medical Services, and of the Trustees of the Australian Museum, Sydney.

† I desire here to record my thanks to Commander H. T. Bennett, D.S.O., R.N., who commanded H.M.A.S. "Geranium" during these years, for enabling me to avail myself of every possible opportunity to collect biological specimens and for securing no mean number himself. The officers and men of the ship interested themselves in collecting, and further enhanced my personal collection. To Sick Berth Petty Officers Beatty and Kirkwood, who helped Dr. Hudson and myself with the preservation of specimens, my thanks are also tendered.—W.E.J.P.

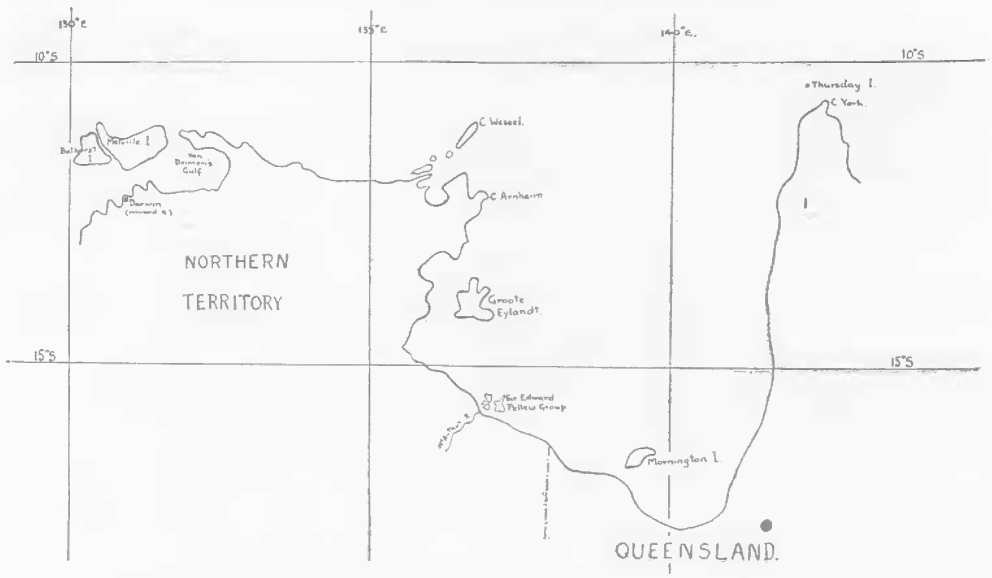
The "Geranium" collection has been presented to the Australian Museum, where it is now housed. A series of duplicates is being prepared for the Queensland Museum.

Attention is drawn to the fact that the word Pellew in this report invariably refers to Sir Edward Pellew Group of Islands in the Gulf of Carpentaria, Australia, and not to any other locality of somewhat similar name.

LIST OF FAMILIES REPRESENTED IN THE COLLECTION.

(In the order in which they are dealt with. The name of a well-known species is given after the Family.)

1. GALEIDÆ.—Sharks.
2. DASYATIDÆ.—Sting Rays.
2A. RHINOBATIDÆ.—Shovel-nosed Rays.
3. CHIROCENTRIDÆ.—Wolf Herring.
4. CLUPEIDÆ.—Herrings.
5. DOROSOMIDÆ.—Hair-Backed Herring.
6. ENGRAULIDÆ.—Anchovy.
7. PLOTOSIDÆ.—Eel-tailed Cat Fish.
8. ARIIDÆ.—Salmon Cat Fish.
9. MURŒNESOCIDÆ.—Eels.
10. MURÆNIDÆ.—Reef-eels.
11. BELONIDÆ.—Long-toms.
12. HEMIRHAMPHIDÆ.—Garfish.
13. EXOCŒTIDÆ.—Flying Fish.
14. GADIDÆ.—Cod-like Fish.
15. ATHERINIDÆ.—Hardyhead.
16. MELANOTÆNIIDÆ.—Freshwater Sunfish.
17. MUGILIDÆ.—Mullet.
18. SPHYRÆNIDÆ.—Sea Pike.
18A. POLYNEMIDÆ.—Cooktown Salmon.
18B. SCOMBRIDÆ.—Mackerel.
19. CARANGIDÆ.—Trevally.
20. LEIOGNATHIDÆ.—Pony Fish.
21. APOGONIDÆ.—Soldier Fish.
22. AMBASSIDÆ.—Perch-like Fish.
23. LATIDÆ.—Giant Perch.
24. EPINEPHELIDÆ.—Rock Cod.
25. PSEUDOCHROMIDÆ.—Coral Fish.
26. LUTIANIDÆ.—Red Snapper, Hussar.
27. POMADASIDÆ.—Sweet Lips.
28. TERAPONTIDÆ.—Grunter.
29. LETHRINIDÆ.—Grey Snapper.
30. SPARIDÆ.—Bream.
31. GERRIDÆ.—Silverbelly.
32. MULLIDÆ.—Red Mullet.
33. SILLAGINIDÆ.—Whiting.
34. MONODACTYLIDÆ.—Silver Bat Fish.
35. PLATACIDÆ.—Bat Fish.
36. DREPANIDÆ.—Spotted Bat Fish.
37. SCATOPHAGIDÆ.—Butter Fish.
38. CHÆTODONTIDÆ.—Ornate Coral Fish.
39. SIGANIDÆ.—Black Trevally.
40. PARALICHTHYIDÆ.—Flounders.
41. SYNAPTURIDÆ.—Soles.
42. CYNOGLOSSIDÆ.—Tongue Sole.
43. SCORPÆNIDÆ.—Red Rock Cod.
44. PLATYCEPHALIDÆ.—Flathead.
45. POMACENTRIDÆ.—Demoiselle.
46. LABRIDÆ.—Parrot Fish (with separate teeth).
47. SCARIDÆ.—Parrot Fish (with fused teeth).
48. PERIOPTHALMIDÆ.—Mangrove Fish.
49. ECHENEIDÆ.—Sucker Fish.
50. BLENNIIDÆ.—Blenny.
51. CONGROGADIDÆ.—Dagger Fish.
52. BATRACHOIDIDÆ.—Frog Fish.
53. ANTENNARIIDÆ.—Angler Fish.
54. TRIACANTHIDÆ.—Three Spined Leather Jacket.
55. MONACANTHIDÆ.—Leather Jacket.
56. PSILOCEPHALIDÆ.—Long Leather Jacket.
57. OSTRACIIDÆ.—Box Fish.
58. TETRAODONTIDÆ.—Toado.



LOCALITY SKETCH.

Class ELASMOBRANCHII. Subclass SELACHII.
Order EUSELACHII. Family GALEIDÆ. [1.]

Galeocerdo arcticus Faber. Pellew.

The tiger shark frequents these waters in considerable numbers. It affords great sport to the sailors who capture it by hook and line. On one afternoon five of these sharks ranging from seven feet to thirteen feet in length were captured. They were found to contain refuse from the ship, a partly digested green turtle, carapace intact, and some small birds of the sandpiper type.

Aprionodon acutidens Rüppell. Pellew.

Small sharks of this species from eighteen inches to three feet in length were at times caught in considerable numbers by line. They obviously move about in shoals.

Hypoprion macloti Müller and Henle. Pellew.

Appears to be similar in habit to the preceding species.

Order BATOIDEI. Family DASYATIDÆ [2].

Himantura arnak Forskal. Pellew.

Tæniura lymma Forskal. Pellew.

Both these rays were captured from time to time on the sand flats.

There are many Elasmobranchs in Pellew waters, although the number of species appears limited. The commonest species of all is

not represented in the collection, as all our specimens were between six and seven feet long and therefore could not be preserved in our receptacles. This species, which appears from a photograph to be **Rhinobatus armatus** Gray [2a]*, is found basking in the shallow water of the sand flats, often where it is barely deep enough for it to submerge completely.

Class PISCES. Subclass ACTINOPTERI.

Order ISOSPONDYLI. Family CHIROCENTRIDÆ [3].

Chirocentrus dorab Forskal. Pellew.

This fish was met with in schools of four or six at various times. As a table fish it is extremely bony.

Family CLUPEIDÆ [4].

Harengula kanagurta Bleeker. Pellew.

A new record for Australia. Figured herewith (Plate XII., Fig. 1).

Harengula bulan Bleeker. Darwin.

A new record for Australia.

Neosteus ditchela Cuvier and Valenciennes. Pellew.

Our specimen of this species agrees very well with Bleeker's figure (Atl. Ichth. vi. 1870-2, p. 117, plate 269, fig. 2) as **Ilisha hœvennii.**

Herrings are met with in small numbers in the winter months I am informed that large shoals of these fish make their way up to Pellew waters from February to April, but not having witnessed this myself I am unable to say which species take part in this migration. (W.E.J.P.)

Family DOROSOMIDÆ [5].

Nematalosa come Richardson. Darwin.

Family ENGRAULIDÆ [6].

Anchoviella carpentariæ De Vis. Pellew.

Very small fish of this species were met with moving in small shoals over the shallow sand flats during the winter months.

Thrissocles hamiltoni Gray. Darwin.

Order NEMATOGNATHI. Family PLOTOSIDÆ [7].

Tandanus (Neosilurus) hyrtlii Steindachner. Howard River, Darwin.

This freshwater catfish was found dead among the weeds. It had only recently died, as there were no obvious signs of decomposition.

* Two small specimens of *Rhinobatus armatus* Gray have since come to hand from the Northern Territory, collected by Surg. Lieut. G. Courtney, of H.M.A.S. "Geranium" (1926).

Family ARIIDÆ [8].

Arius (Tachysurus) græffei Kner and Steindachner. Pellew.

This was the only marine species of catfish met with, two or three being caught by line on several occasions. A new record for Australia.

Order APODES. Family MURŒNESOCIDÆ [9].

Murœnesox arabicus Bloch & Schneider. Pellew.

Family MURÆNIDÆ [10].

Gymnothorax undulatus Lacépède. Pellew.

Order SYNENTOGNATHI. Family BELONIDÆ [11].

Tylosurus strongylurus Van Hasselt. Pellew.

Tylosurus giganteus Temminck and Schlegel. Pellew.

The commonest species.

Tylosurus ferox Günther. Pellew.

Tylosurus caudimacula Cuvier. Pellew.

The various species of **Tylosurus** above mentioned are caught in company with garfish in the shallow water of the sand flats. They are all good table fish.

Family HEMIRHAMPHIDÆ [12].

Hemirhamphus far Forskal. Pellew and Darwin.

This is the commonest and largest species. It was commoner at Pellew during July than later in the year. Caught by net on the sand flats.

Hemirhamphus welsbyi Ogilby. Pellew.

This species is distinguished by one black spot on the side below the dorsal fin. A few specimens were caught at night alongside the ship and others were taken by net. Also taken at Thursday Island. Previously known only from the two cotypes. Figured herewith (Plate XI., Fig. 3).

Hemirhamphus quoyi Cuvier and Valenciennes. Pellew.

A fairly common species. Figured herewith (Plate XI., Fig. 2).

Arrhamphus sclerolepis Günther. Pellew and Darwin.

Next to the Carangidæ, the Hemirhamphidæ are the commonest fish in Pellew waters. They move in large schools in the shallow water of the sand flats accompanied by longtoms, and are usually taken by net. As in the Mugilidæ the northern species are commonly of a larger size than the southern species. All the garfish are excellent table fish.

Family EXOCŒTIDÆ [13].

Parexocœtus brachypterus Richardson. At sea between Cape Wessel and Cape York.

A single specimen of this species flew on board.

Flying fish are common in the Gulf of Carpentaria, but all seen by us were of small size.

Order ANACANTHINI. Family GADIDÆ [14].

Bregmaceros mcclellandi Thompson. Darwin.

Our only specimen of this rare species was of juvenile form and was obtained in a pool in a coral reef. See McCulloch, *Rec. Austr. Mus.* XV., 1, 1926, p. 30.

Order PERCOMORPHI. Suborder PERCESOCES.

Family ATHERINIDÆ [15].

Hepsetia pinguis Lacépède. Pellew.

Family MELANOTÆNIIDÆ [16].

Melanotænia nigrans Richardson. Howard River, Darwin.

This species was present in large numbers.

Family MUGILIDÆ [17].

Mugil (Liza) waigiensis Quoy and Gaimard. Pellew.

Fish of this species of all sizes are common. The adults frequent the sand flats whilst the young are often found in sandy bottomed pools among rocks. Commoner in July than later in the year.

Mugil longimanus Günther. Pellew.

This is the commonest species. Maximum number present in November.

The Mugilidæ are all good table fish. The flesh is oilier than that of most fish and large specimens are coarse. In northern waters they grow to a larger size than further south.

Family SPHYRÆNIDÆ [18].

Sphyræna altipinnis Ogilby. Pellew.

A common species, the majority of specimens being 24 to 30 inches in length. A new record for Australia.

Suborder RHEGNOPTERI. Family POLYNEMIDÆ [18A].

Polynemus (Eleutheronema) tetradactylus Shaw. Pellew.

Two specimens of this species between twenty and thirty inches in length were captured on the sand flats. They do not appear in the collection, having been used for table purposes, their flesh being of good quality.

Series SCOMBRIFORMES. Family SCOMBRIDÆ [18B].

No representative of this family appears in the collection, but small schools of fish about two feet long were seen in Pellew waters, and one specimen was captured but not preserved.

They certainly belonged to this family, and from superficial observation I believe them to be young of **Scomberomorus commerson** Lacépède. (W.E.J.P.)

Series CARANGIFORMES. Family CARANGIDÆ [19].

Caranx speciosus Forskal. Pellew.

This is the commonest species of **Caranx.** The fish move in shoals over the sandy bottom, their average size being a little over a foot in length.

When caught this fish is a silvery blue, with several transverse bands of a slightly darker tint above the lateral line, and a pale yellow below; almost immediately the pale yellow becomes much depeer and a yellow tinge is seen above the lateral line. The yellow tint then fades and returns several times before the fish dies; after death the colour is invariably deep yellow, somewhat darker above the lateral line than below it. The smaller the fish, the less the intensity of the yellow. Only occasionally did these fish take a bait.

Caranx bucculentus Alleyne and Macleay. Pellew.

This fish is grey dorsally, fading to white over a smaller ventral area. A very dark mottling can be discerned through the grey. As the fish dies the head and nape become a very dark grey indeed.

Caranx parasitus Garman ? Pellew.

This small fish, a beautiful silver with a black post-opercular spot, was obtained among the tentacles of a large rhizostome medusa.

Caranx forsteri Cuvier and Valenciennes. Pellew.

A fish which takes a bait with avidity. The young of this species move in small shoals over the sandy bottoms.

Caranx radiatus Macleay. Pellew.

Our specimens, which were all about eight or nine inches long, showed great variation in prolongation of fin rays, as follows :—

(1) A slight prolongation of the rays of both dorsal and anal fins.

(2) Marked prolongation of the rays of both these fins.

(3) Marked prolongation of dorsal rays and only slight prolongation of anal rays.

Caranx armatus Forskal. Pellew.

A fish of the common bluish-grey colour, in which darker bands can be distinguished.

After death the bands are indistinguishable.

Alectis indica Rüppell. Pellew.

This fish, conspicuous on account of its extreme silverness and elongated fin rays, was caught in small numbers on the sand flats during July but was not met with later in the year.

Ulua mandibularis Macleay. Pellew.

This little-known fish was caught by net on several occasions—a pair being captured each time.

Trachinotus baillonii Lacépède. Pellew.

Caught in small numbers on sandy beaches. This fish can at times be seen darting about in extremely shallow water.

Trachinotus ovatus Linnæus. Pellew.

Caught less frequently than the preceding species. Our largest specimen was twenty-three inches long.

Scomberoides sancti-petri Cuvier and Valenciennes. Pellew.

Young specimens of this species were caught in almost every haul.

It is an extremely voracious fish and was at times noticed to attack fish of a relatively large size. Fish of about three feet long were taken by net on several occasions.

The family Carangidæ is well represented in the Pellew waters, both in number of species and in the number of fish present. Of all the fish caught by us almost half belonged to this family. These fish are all good for eating purposes, their only defect being that the flesh becomes soft and deteriorates in flavour in a comparatively short time after capture. The Carangidæ as a whole were more plentiful in July than in later months.

There is one large species of **Caranx** (our largest specimen was three feet five inches in length), which is met with from time to time and which unfortunately is not represented in the collection.

Family LEIOGNATHIDÆ [20].

Gazza equuliformis Rüppell. Pellew.

Leiognathus splendens C. & V. Pellew and Darwin.

Leiognathus mortoniensis Ogilby. Pellew.

Leiognathus sp. Darwin. Austr. Museum Regd. No. *IA. 1540.*
Too young for specific identification.

The Leiognathidæ or pony fish are small fish resembling the silver bellies (Gerridæ) in form and habit, but they have not the comparatively large deciduous scales which are such a noticeable characteristic of the latter.

Series PERCIFORMES. Family APOGONIDÆ [21].

Apogon ruppellii Günther. Darwin.

Archamia lineolata C. & V. Pellew.

Family AMBASSIDÆ [22].

Ambassis (Priopis) gymnocephalus Lacépède. Darwin.

Ambassis (Ambassis) nalua Hamilton-Buchanan. Darwin.

Family LATIDÆ [23].

Lates calcarifer Bloch. Pellew and Darwin.
At both localities this fish was caught by net on mud flats.

Psammoperca waigiensis Cuvier and Valenciennes. Pellew.

Family EPINEPHELIDÆ [24].

Centrogenys waigiensis Cuvier and Valenciennes. Darwin.
Caught in a pool in coral reef.

Plectropomus maculatus Bloch. Pellew.
A small specimen caught among coral.

Cephalopholis pachycentron Cuvier and Valenciennes. Pellew.

Epinephelus fasciatus Forskal. Pellew.

The majority of specimens of this species are a dusky brown with vertical bands of a slightly darker tint, having a white edge to their fins. One specimen caught well away from the mainland was of a reddish colour with conspicuous brownish-grey vertical bands and with the edges of the fins a much cleaner white than the other specimens.

The species is common among the rocks.

Epinephelus tauvina Forskal. Pellew.

A fairly common species caught by line usually at night.

Epinephelus megachir Richardson. Pellew and Darwin.

Similar in habit to the preceding species.

The various species of rock cod, as their name suggests, frequent the rocky portions of the coast and coral reefs. They are therefore seldom taken by net but they take a bait freely. With the exception of large specimens, which are tough-skinned and coarse, they are excellent eating fish.

Although the number of specimens captured was considerable it was seldom that one exceeded seven inches in length in the waters of Sir Edward Pellew group.

Family PSEUDOCHROMIDÆ [25].

Pseudochromis punctatus Richardson. Pellew and Darwin.

Caught in a pool on a coral reef.

Family LUTIANIDÆ [26].

Lutianus russelli Bleeker. Pellew.

Lutianus fulviflamma Forskal. Pellew.

Lutianus erythropterus Bloch. Pellew.

The changes of colour which occur in this fish as it grows are particularly striking; it is at all stages a beautiful fish. The young fish of 70 cms. in length is a rose-pink with a tinge of blue and brown here and there on the body.

The dorsal, ventral and anal fins are black, and from the spinous dorsal an oblique black line runs forward through the eye to the mouth. Immediately anterior to the tail is a large black spot surrounded by a lighter zone. The pectoral fins and tail are almost colourless.

In a specimen of 100 cms. most of the black has disappeared. The fish is pink except for the oblique line which passed through the eye and for a slight tinge of colour where the precaudal spot was. The oblique line has now become a brown colour.

The adult colouring is assumed by the time the fish has reached a length of 250 cms. It is then pink all over, the dorsal scales showing a tinge of yellowish-brown, the ventral scales fading to a very pale pink, whilst between the eyes there is a zone of deep pink (almost scarlet).

There is now no trace of the earlier black markings.

Lutianus sebæ Cuvier and Valenciennes. Pellew.

The "Government Bream" is another gorgeously marked fish which shows considerable alteration with growth and variation among fish of the same size.

Small fish show a considerable amount of white between the bright red oblique lines which form the broad arrow.

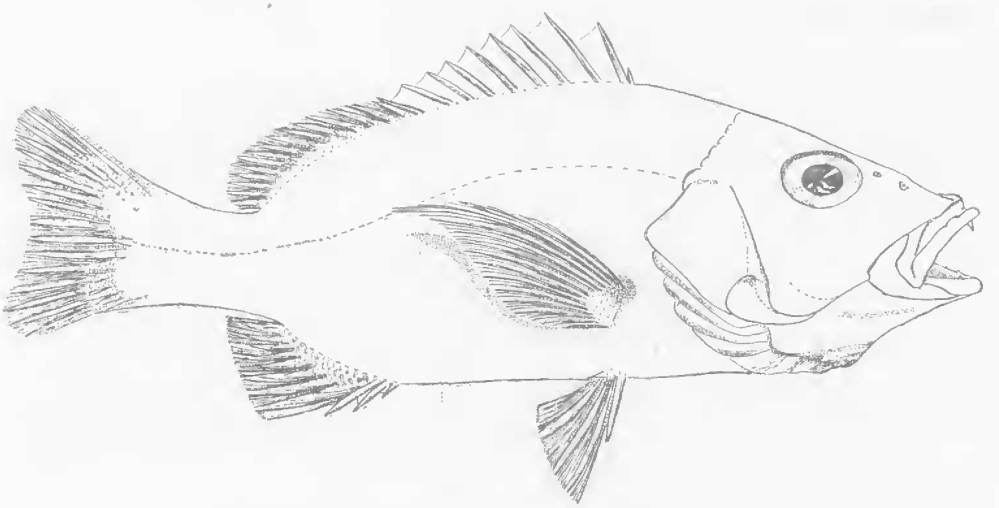
Medium sized fish (400 cms. in length) are red all over except ventrally where they fade to white, and have the lines of the arrow a much darker red.

In really large fish the lines of the arrow are barely distinguishable, the whole of the dorsal half of the fish having become a dark red. Fish of this species from 300 cms. to 500 cms. in length we consider among the best in Australian waters for eating purposes.

Lutianus waigiensis Quoy and Gaimard. Pellew.

This species is conspicuously marked with longitudinal bands of brown and yellow.

It is one of the commoner fish caught by line among rocks close to the shore. (Text-figure 1.)



Text-figure 1.—*Lutianus waigiensis* Quoy & Gaimard.
E. J. Paradice, del.

The Lutianidæ are a family of brilliantly-coloured fish which live among rocks and coral and take a bait freely. Many of the species rank very high as table fish.

Family POMADASIDÆ [27].

Plectorhynchus pictus Thunberg. Pellew.

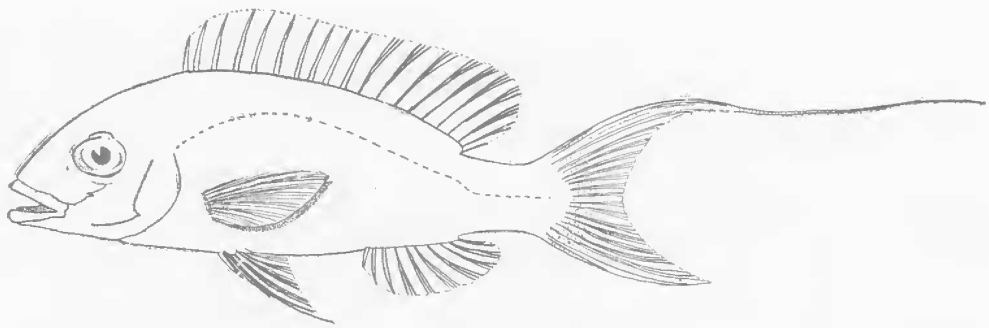
Plectorhynchus reticulatus Günther. Pellew.

Pomadasys nageb Rüppell. Darwin.

A young specimen, constituting a new record for Australia.

Scolopsis temporalis Cuvier & Valenciennes. Pellew.

A rather rare species caught by line in the region of coral reefs. It is a brilliantly marked fish, the predominating colour of the dorsal half being a bluish-green. This fades to white ventrally. The scales are fairly large and each scale stands out prominently on account of colour arrangement. Both our species were rendered conspicuous by a caudal filament greater in length than the longest rays of the upper lobe from which it springs. (Text-figure 2.)



Text-figure 2.—*Scolopsis temporalis* Cuvier and Valenciennes.

W. E. J. Paradice, del. (modified after McCulloch).

Family TERAPONTIDÆ [28].

Helotes sexlineatus Quoy & Gaimard. Pellew.

In our specimens of this species the longitudinal lines are interrupted by six vertical bands of almost white.

Terapon theraps Cuvier & Valenciennes. Pellew.

No adults of this species were obtained, but large numbers of juvenile specimens up to one inch in length were regularly found sheltering in clumps of floating weed during the months of June and July.

Terapon puta Cuvier and Valenciennes. Pellew.

This species was caught in large numbers by fish-trap on a sandy bottom a considerable distance from shore. It makes a peculiar grunting or humming noise when out of water. At times this species was caught by line.

Terapon servus Bloch. Pellew.

Often caught by fish-trap in company with the preceding species, which it resembles in regard to grunting.

It was caught by line much more frequently than the preceding species.

Terapon caudavittatus Richardson. Pellew and Darwin.

A species fairly common on sand flats, comes close to the shore and takes a bait freely.

Terapon unicolor Günther. Howard River.

This freshwater species was captured in the Howard River, 35 miles from Darwin.

The various species of this family have a flesh which is of good eating quality, but most of them are of small size and very bony.

Family LETHRINIDÆ [29].

Lethrinus glyphodon Günther. Pellew.

The common species.

Lethrinus hæmatopterus Temminck and Schlegel. Pellew.

Pentapus setosus Cuvier & Valenciennes. Pellew.

Fairly common at times on sandy bottom.

Pentapus cyaneotæniatus Richardson. Pellew.

This family contains many ornate species. Those of the genus **Lethrinus** remain mainly in the vicinity of coral reefs or rocks, whilst the various species of **Pentapus** (all small fishes) move in shoals over areas of sandy bottom. Some of the species of **Lethrinus** grow to a large size, and are particularly fine eating fish, known by the names of "Island Snapper," "Grey Snapper," or "Yellow-mouthed Snapper," in various localities. No very large specimens were obtained in Pellew waters.

Family SPARIDÆ [30].

Sparus berda Forskal. Pellew and Darwin.

At Darwin this species is common in the vicinity of the piles of the jetty, where it is caught by line. When taken from the water these fish are a dark silvery grey dorsally, fading to white ventrally. There is a conspicuous black spot which extends from the ventral fins half way to the anal fins. As the fish dies this spot fades, being entirely

absent after death. This spot was not present at any time in specimens captured at Pellew, where the fish is fairly common close to the shore during October. It was not met with earlier in the year. It is an excellent eating fish.

Family GERRIDÆ [31].

Xystæma punctatum Cuvier & Valenciennes. Pellew.

A common species.

Xystæma abbreviatum Bleeker. Pellew.

The commonest species.

Xystæma carinatum Alleyne & Macleay. Pellew.

The various species of **Xystæma** are small silvery fish with scales which come off with the slightest rubbing. They move about in shoals on the sand flats. In spite of their small size they are excellent for eating purposes, being relatively free from bones.

Family MULLIDÆ [32].

Pseudupeneus jeffi Ogilby. Pellew.

This was the only species of red mullet obtained. This fish, like **Xystæma,** is of a small size, but has a flesh of excellent quality and free from small bones. After the fish has been scaled it often becomes a much darker red than it was with the scales on; this is not a sign of deterioration.

Family SILLAGINIDÆ [33].

Sillago maculata Quoy and Gaimard. Pellew.

Sillago sihama Forskal. Darwin.

Sillago ciliata Cuvier and Valenciennes. Pellew.

Although considerable numbers of whiting were met with on the sand flats they were all immature, the largest being about 170 cms.

Suborder CIRRHITOIDEI. Series EPHIPPIFORMES.

Family MONODACTYLIDÆ [34].

Monodactylus argenteus Linnæus. Pellew.

This fish moves about in small shoals.

Family PLATACIDÆ. [35].

Platax teira Forskal. Pellew.

This species was captured on several occasions on beaches in the proximity of rocky headlands or coral reefs. The dark vertical bands

are conspicuous in the smaller fish but inconspicuous in the larger specimens, which are of a darker brown all over.

Platax novemaculeatus McCulloch. Pellew.

Large schools of this species were caught at times on the sand flats. The average size of these fish is ten inches, and the majority of them are of a silver colour, with a brown tinge over the nape and head, and with oblique bands of darker brown transversing this area. The species however, shows great variation of colouring. In the one school, fish which are silver all over, showing no dark bands, will be seen, and also fish which have a brown tinge all over with almost black oblique lines. These colour variations with all intermediate forms, occur in small fish as well as those of average size; but it was noted that the few extremely large specimens were all of the dark type. This is an excellent fish for eating purposes. It was often caught in company with Carangids and, like them, was more plentiful in July than later in the year.

(Dr. Hudson informs us that in 1925 he did not meet with this fish.)

Family DREPANIDÆ [36].

Drepane punctata Gmelin. Pellew.

This species is identical in habit with **Platax novemaculeatus,** and further has similar qualities as a food fish.

Suborder SQUAMIPENNES.

Series TOXOTIFORMES. Family SCATOPHAGIDÆ [37].

Scatophagus ætate-varians De Vis. Pellew.

This species is universally present in small numbers within a reasonable distance of the shore throughout the waters of the Gulf of Carpentaria.

Family CHÆTODONTIDÆ [38].

Chætodon aureofasciatus Macleay. Pellew.

Parachætodon ocellatus Cuvier & Valenciennes. Pellew.

Caught by net whilst hauling in the vicinity of rocks and coral.

Suborder AMPHACANTHI. Family SIGANIDÆ [39].

Siganus concavocephalus Paradice. Pellew.

A new species, figured herewith (Plate XII., fig. 2).

Siganus lineatus Cuvier & Valenciennes. Wessel and Pellew.

Siganus nebulosus Quoy & Gaimard. Pellew.

The Siganidæ are fish which tend to remain in the vicinity of rocks; they are capable of inflicting injury by the spines of their fins. Our Pellew specimens were caught by net near rocks, whilst the Cape Wessel specimens were speared from the rocks by an aborigine and given to a party from the "Geranium" as a peace offering.

Order HETEROSOMATA. Family PARALICHTHYIDÆ [40].

Pseudorhombus multimaculatus Günther. Pellew and Darwin.

Flounders are met with on most of the flats of Sir Edward Pellew group, our largest specimens coming from the rather muddy flats at the southern end of the group near the mainland. They are one of the best eating fish in Australian waters.

Family SYNAPTURIDÆ [41].

Synaptura setifer Paradice. Darwin.

Caught by net on shallow mud flats. It is peculiar in having tufts of setæ scattered about its body (Text-figure 3 on p. 102).

Family CYNOGLOSSIDÆ [42].

Rhinoplagusia guttata Macleay. Pellew.

Fairly common on mud flats in company with flounders. **Rhinoplagusia guttata** Macleay was recently described and figured by McCulloch & Whitley (Rec. Austr. Mus. xiv., pt. 4, 1925, p. 350, fig. 3) as **Rhinoplagusia japonica** Schlegel. According to Mr. J. R. Norman of the British Museum (Biol. Res. Endeavour, v. 5, 1926, p. 300), however, Macleay's species differ from the typical **japonica** "chiefly in having a longer head, somewhat smaller mouth, longer nasal papilla on the blind side, in the form of the scales, and in the colouration."

Order CATAPHRACTI.

Series SCORPÆNIFORMES. Family SCORPÆNIDÆ [43].

Scorpæna bynoensis Richardson. Cape Wessel.

Caught in a pool under dead coral.

Series PLATYCEPHALIFORMES. Family PLATYCEPHALIDÆ [44].

Platycephalus arenarius Ramsay and Ogilby. Pellew.

A few specimens were caught by line in clear water at the northern end of the group during October; not met with earlier.

Insidiator nematophthalmus Günther. Pellew.

Occasional specimens met with both on sand and mud flats at all times.

Both the above are good for table purposes.

Order CHROMIDES. Family POMACENTRIDÆ [45].

Amphriprion tricolor Günther. Darwin.

Four of this species were caught in a coral pool. These are a valuable series and are figured herewith. (Plate XIII.)

Pomacentrus wardi Whitley. Cape Wessel.

A single specimen of this species was obtained in a pool among dead coral. Another specimen was later obtained by Mr. Melbourne Ward at Heron Island, Capricorn Group, Queensland. This latter specimen has been described by the junior author (in press), being designated as the type of the species.

Glyphisodon palmeri Ogilby. Pellew.

Order PHARYNGOGNATHI. Family LABRIDÆ [46].

Chœrodon cyanostolus Richardson. Pellew.

Chœrodon olivaceus De Vis. Pellew.

Chœrodon cyanodus Richardson. Pellew.

These parrot fishes are common among rocks where they are caught by line. They are perfectly safe to eat but the flesh deteriorates rapidly and is comparatively poor in flavour.

Family SCARIDÆ [47].

Scarus pyrrostethus Richardson. Pellew.

Scarus pyrrostethus australianus Paradice. (Plate XIV.) Cape Wessel.

This family is not as well represented as the Labridæ. The flesh is similar.

Our Cape Wessel specimen was caught under a ledge of submerged rock by the blacks. They work their hands about under the ledges in shallow water until they feel a fish and then approximate their hands from opposite sides of the fish until they have it safely secured.

Order GOBIOIDEI. Family PERIOPHTHALMIDÆ [48].

Periophthalmus kœlreuteri Pallas var. **argentilineatus** Cuvier and Valenciennes. Pellew.

This most interesting little fish is very common on the mud flats and among the mangroves both in Sir Edward Pellew group and at Darwin.

When the tide is high it is frequently seen resting on sloping mangrove roots the anterior half of its body out of the water and the tail portion in the water. At low tide it rests in holes excavated in the mud by crabs, with its tail down the hole, its modified pectoral fins on the edge of the hole and its head projecting, or else it hops about in the mud, using its flattened pectoral fins to help it make its leaps of about eighteen inches or two feet, which carry it quickly across the mud into comparative safety in the maze of mangrove roots. It is noticeable that the positions adopted by this fish are such that the tail, which is an accessory organ of respiration, is either in the water or at least kept shaded and moist in order to carry out this function. It is interesting to note that on various occasions on which one of us has endeavoured to convey these fish back to the ship, they have died in a comparatively short time if carried in a can of water where they have to remain entirely submerged, but have arrived in good condition when transported in a can with sufficient weed in it to allow the fish to rest with the greater part of its body out of the water. The late Mr. H. E. Finckh of Mosman, Sydney, a most skilful and experienced aquarium worker, arranged the transport of these fish to his aquarium and kept them in good health there for a long period in surroundings made to simulate their natural conditions. At Darwin this fish is known as Kangaroo Fish.

Order DISCOCEPHALI. Family ECHENEIDÆ [49].

Echeneis naucrates Linnæus. Pellew and Darwin.

This fish was captured by line, in fish-traps, and at times drawn on board adhering to tiger sharks.

Order JUGULARES.

Series BLENNIIFORMES. Family BLENNIIDÆ [50].

Petroscirtes obliquus Garman. Pellew.

Salarias meleagris C. & V. Cape Wessel and Pellew.

These fish are found in shallow pools among rocks or dead coral. They are particularly agile out of water and often do not hesitate to leave a small pool in which they are being pursued, in order to make their way to an adjoining pool by jumping over small broken wet stones.

Series ZOARCIFORMES. Family CONGROGADIDÆ [51].

Congrogadus subducens Richardson. Darwin.

Caught in a pool among coral.

Suborder HAPLODOCI. Family BATRACHOIDIDÆ [52].

Coryzichthys diemensis Le Sueur. Darwin.

Caught in a pool among coral.

Family ANTENNARIIDÆ [53].

Antennarius urophthalmus Bleeker. Darwin.

Order PLECTOGNATHI.

Suborder SCLERODERMI. Family TRIACANTHIDÆ [54].

Triacanthus biaculeatus Bloch. Pellew and Darwin.

A common species caught by net on sandy beaches. In the living fish the dorsal spine is produced as a fine filament almost the length of the fish. This filament is very brittle and specimens seldom reach an institution with it intact.

Family MONACANTHIDÆ [55].

Monacanthus chinensis Bloch. Pellew.

A considerable number of specimens of this fish was collected in 1925 but on previous occasions the species was not met with.

Family PSILOCEPHALIDÆ [56].

Psilocephalus barbatus Gray. Pellew.

A single specimen of this species was caught by net. It was noted that whilst lying on the beach this fish was able to throw itself a foot into the air.

Suborder OSTRACODERMI. Family OSTRACIIDÆ [57].

Ostracion rhinorhynchus Bleeker. Darwin.

This fish was speared from the ship whilst lying alongside the jetty.

Suborder GYMNODONTES. Family TETRAODONTIDÆ [58].

Leiodon patoca Hamilton-Buchanan. Darwin.

Spheroides lunaris Bloch and Schneider. Pellew.

Spheroides whitleyi Paradice. Pellew.

A new species figured and described herewith (Plate XV.).

Tetraodon immaculatus Bloch and Schneider var. **manillensis** Procé. Pellew.

Tetraodon nigropunctatus Bloch and Schneider. Pellew.

The fishes of this family are definitely poisonous, having caused the deaths of men and lower animals on various occasions. (Paradice, W. E. J., Med. Journ. Aust. 1924 (2), p. 25.)

GENERAL REMARKS ON FISH OF SIR EDWARD PELLEW GROUP.*

This group of islands extends some twenty-five miles out into the Gulf of Carpentaria from the western part of the southern shore, in the region of the mouth of McArthur River. The beaches of the northern third of the group consist of sand or broken coral, and are washed by clear water in which there is a comparatively prolific growth of coral, e.g., Paradice Bay and Base Beach. The beaches of the southern portion of the group are mud flats running back in many places to mangrove swamps. The water here is muddy, probably from the McArthur River, and in it the only corals found are a few scattered astrean genera.

In the clear water to the north, Hemirhamphidæ (garfish) and Belonidæ (longtoms), are met with in large numbers at all times, whilst Carangidæ (trevally), etc. are seen in great numbers during June and in smaller numbers during later months. As the Carangidæ diminish in numbers in the clear water, they are replaced by small numbers of Sparidæ (bream) and Platycephalidæ (flathead). In the zone between the clean beaches and the definitely muddy beaches the predominating fish are **Platax novemaculeatus** and **Drepane punctata** (e.g., Geranium Bay). On the mud flats the Cynoglossidæ (tongue soles) are present and the Paralichthyidæ (flounders) reach their largest size. Carangidæ in small numbers and various Elasobranchii (sharks and rays) are present. Among the rocks and coral in clear water the Epinephelidæ (rock cods) and Lutiandæ (red snapper and hussars) are found (e.g., Pearce, Urquhart, and Observation Islands). None of the species of the two families just mentioned were caught in any way approaching the size to which the same fish grow in Torres Strait or along the Great Barrier Reef. The sandy beaches of this group appear to be the ideal environment for Sillaginidæ (whiting) and we are unable to offer any explanation for failure to obtain large fish of this family. Trolling and fishing with a live bait are not included here, as these methods were not used. No doubt many fishes, such as the larger Carangidæ and Scombridæ (Spanish mackerel), would have been captured by this means, as they are at Thursday Island, a live herring being the usual bait. Fishes could at all times be described as prolific in the waters of the Sir Edward Pellew Group.

* Paradice, W. E. J. —The "Sir Edward Pellew Group of Islands" Report, with special reference to biology and physical features. The Parliament of the Commonwealth of Australia 1923-24, No. 143, F. 15481. This report gives observations on all classes of animals except fish.

ADDITIONS.

As this paper was completed for the press, a further batch of fishes was received from Surg. Lieut. G. Courtney of H.M.A.S. "Geranium," who had collected them during 1926 in the Northern Territory.

All were referable to known species and are listed by McCulloch & Whitley, but some had not previously been obtained by "Geranium" collectors in those waters. The additions are as follows :—

Chiloscyllium trispeculare (Richardson). Knight Reef, Clarence Strait, Northern Territory.

Stegostoma tigrinum (Pennant). Clarence Strait, Northern Territory.

[*Squalus tigrinus* Pennant, Ind. Zool. 1769, p. 24 (*fide* Sherborn). This is called by the later name *Stegostoma tygrinum* Bonnaterre in McCulloch and Whitley's list.]

Squalomugil nasutus (De Vis). Adam Bay, near Darwin, Northern Territory.

This species is common on the mud flats, where specimens of about 140 mm. in length were noted swimming with a considerable portion of their heads above the surface.

Holacanthus (Chætodontoplus) duboulayi Günther. Darwin, Northern Territory.

Speared alongside the jetty.

Pomacentrus chrysurus Cuvier and Valenciennes. Melville Island, Northern Territory.

Gobius ornatus Rüppell. Adam Bay, Northern Territory.

Scartelaos viridis Hamilton-Buchanan. Adam Bay, Northern Territory.

Caught on the mangrove flats in company with **Periophthalmus.**

An interesting specimen in Dr. Courtney's collection was a large sea-snake, which on being opened was found to contain an exceptionally large specimen of **Coryzichthys diemensis** Le Sueur. Mr. J. R. Kinghorn has kindly identified the sea snake as *Astrotia stokesii* Gray.

Dr. Courtney is able to add another case of poisoning by the Genus **Tetraodon,** the ship's cat having been fatally poisoned by eating a small portion of the flesh of **Tetraodon immaculatus.**

SPECIES FROM PORT DARWIN AND THE SIR EDWARD PELLEW GROUP, NORTHERN TERRITORY, WHICH ARE NOT LISTED FROM QUEENSLAND, BY McCULLOCH AND WHITLEY.

HYPOPRION MACLOTI Müller & Henle. Pellew.

Carcharias (Hypoprion) macloti Müller & Henle, Plagiost. 1839, p. 34, pl. x. New Guinea.

HARENGULA BULAN Bleeker. Darwin.

Clupalosa bulan Bleeker, Verh. Bat. Gen. xxii., 1849, Bijdr. Ichth. Mad., p. 12. Madura Island, etc., E. Indies.

HARENGULA KANAGURTA Bleeker. Pellew.

Alausa kanagurta Bleeker, Verh. Bat. Gen. xxiv., 1852, Haring, p. 34. Batavia.

ARIUS (TACHYSURUS) GRÆFFEI Kner & Steindachner. Pellew.

Arius græffei Kner & Steindachner, Sitzb. Akad. Wiss. Wien liv. (1866), 1867, p. 383, fig. 12. "Samoa"=East Indies ?

GYMNOTHORAX UNDULATUS Lacépède. Pellew.

Muræenophis undulatus Lacépède, Hist. Nat. Poiss. v., 1803, pp. 629 & 644. South Seas.

TYLOSURUS CAUDIMACULA Cuvier. Pellew.

Belone caudimacula Cuvier, Règne Anim., ed. 2, ii., 1829, p. 285. Based on Russell's pl. 176 of "Kuddera A" from Vizagapatam.

SPHYRÆNA ALTIPINNIS Ogilby. Pellew.

Sphyræna altipinnis Ogilby, Proc. Roy. Soc. Qld. xxiii., 1910, p. 8. Aru Islands.

BREGMACEROS MCCLELLANDI Thompson. Darwin.

Bregmaceros mcclellandi Thompson, Mag. Nat. Hist. (Charlesw.) iv., 1840, p. 184, text-fig. Ex Cantor MS. Delta of the Ganges.

ULUA MANDIBULARIS Macleay. Pellew.

Caranx mandibularis Macleay, Proc. Linn. Soc. New South Wales vii., 1882, p. 356. New Guinea.

APOGON RUPPELLII Günther.

Apogon ruppellii Günther, Cat. Fish. Brit. Mus. i., 1859, p. 236. Australian Seas.

AMBASSIS (PRIOPIS) GYMNOCEPHALUS Lacépède. Darwin.

Lutjanus gymnocephalus Lacépède, Hist. Nat. Poiss. iv., 1802, p. 216. Tropical Pacific.

CEPHALOPHOLIS PACHYCENTRON Cuv. & Val. Pellew.

Serranus pachycentron Cuvier & Valenciennes, Hist. Nat. Pois. ii., 1828, p. 295. No locality given.

PSEUDOCHROMIS PUNCTATUS Richardson. Darwin & Pellew.

Assiculus punctatus Richardson, in Stokes' Discov. in Austr. i., 1846, Append. p. 494, pl. ii., figs. 1-5. Coast of Australia.

POMADASYS NAGEB Rüppell. Darwin.

Pristipoma nageb Rüppell, Neue Wirbelth. Abyssin., Fische 1838, p. 124, pl. xxx., fig. 2. Djedda, Red Sea.

PENTAPUS CYANEOTÆNIATUS Richardson. Pellew.

Mænoides ? cyaneo-tæniatus Richardson, Icon. Pisc. 1843, p. 8, pl. v., fig. 1. Depuch Island, N.W. Australia.

SIGANUS CONCAVOCEPHALUS Paradice. Pellew.

SYNAPTURA SETIFER Paradice. Darwin.

AMPHIPRION TRICOLOR Günther. Darwin.

Amphiprion tricolor, Günther, Cat. Fish. Brit. Mus. iv., 1862, p. 8. Port Essington.

POMACENTRUS WARDI Whitley. Darwin.

Pomacentrus wardi Whitley, Rec. Austr. Mus. xv. (in press). Heron Island, Capricorn Group, Queensland.

SCARUS PYRROSTETHUS AUSTRALIANUS Paradice. Cape Wessel.

PETROSCIRTES OBLIQUUS Garman. Pellew.

Petroscirtes obliquus Garman, Bull. Mus. Comp. Zool. Harv. xxxix. 8, 1903, p. 237, pl. iv., fig. 3. Suva, Fiji.

ANTENNARIUS UROPHTHALMUS Bleeker. Darwin.

Antennarius urophthalmus Bleeker, Nat. Tijd. Ned. Ind. ii., 1851, p. 488 Riouw, East Indies.

OSTRACION RHINORHYNCHUS Bleeker. Darwin.

Ostracion rhinorhynchus Bleeker, Verh. Bat. Gen. xxiv., 1852, p. 34 (*fide* Weber & Beaufort 1911).

TETRAODON IMMACULATUS Bloch & Schneider, var. MANILLENSIS Procé. Pellew.

Tetrodon manillensis Procé, Bull. Soc. Sci. Philom. 1822, p. 130 (*fide* Günther 1870).

LEIODON PATOCA Hamilton-Buchanan. Darwin.

Tetrodon patoca Hamilton-Buchanan, Fish. Ganges 1822, p. 7 & 363, pl. xviii., fig. 2 (*fide* Günther 1870).

SPHEROIDES WHITLEYI Paradice. Pellew.

SUPPLEMENT BY W. E. J. PARADICE, M.B., Ch.M.

Family SIGANIDÆ.

Genus SIGANUS Forskal.

Siganus concavocephalus sp. nov. (Plate XII., Fig. 2).

D.i., xiii./10 ; A. vii./9 ; P. 15 ; V. i./3/i. ; C. 16.

Head (33 mm.) 4.2 in length to middle caudal ray (138 mm.). Maximum depth (at a point midway between vent and origin of anal fin) (53 mm.) 2.6 in same. Maximum diameter of eye (10 mm.) 3.3 in length of head. Vertical diameter of eye (9 mm.) approximately equal to the inter-orbital space, 3.7 in same. Least depth of caudal peduncle (6.5 mm.) 1.5 in max. diameter of eye. Form elongate ovate, compressed, with a marked concavity between the snout and procumbent dorsal spine. Profiles convex except antero-superiorly, where there is a concavity as above-mentioned, having its deepest part above the centre of the eye. The postero-inferior portion of the profile is the most markedly convex, whilst the antero-inferior portion approaches nearest to a straight line. Head naked except for the upper portion of the operculum. Eye large with maximum diameter equal to the distance of the eye from the posterior angle of the operculum. Interorbital space very slightly convex. Snout rounded ; two nostrils on each side, the anterior being covered by a flap-like nasal tentacle. Opercular edges entire ; a very small opercular flap. Gill openings wide, several poorly defined striæ on operculum. A bony crest in front of eye. Maxillary reaching two-thirds way (approx.) to the vertical of anterior border of eye. Teeth forming a comb-like cutting edge.

Body covered with very small cycloid scales which extend on to the nape, breast, and caudal fin. Vent immediately behind posterior membrane of ventrals. Lateral line follows dorsal curvature from its origin at the operculum to the caudal peduncle along which it runs horizontally. Dorsal spines strong,

preceded by a procumbent spine. Rays diminish very slightly in size from before back to the sixth, after which the decrease is more marked. Anal similar to dorsal but with stronger spines. Pectorals pointed, the second ray being longest. Ventrals angular, the first spine equal in length to the third dorsal spine. Caudal forked, the upper lobe being slightly longer and more pointed than the lower.

Colour Markings.—A greyish-brown ground, more brown dorsally and more grey ventrally. Body comparatively evenly covered with white spots which are most discreet and conspicuous immediately posterior to the pectoral fin, where they are white ovals on a grey ground; their long diameter 3 mm. Elsewhere the spots tend to vary a little in shape and are less conspicuous. A few dark-brown and grey spots are irregularly scattered about the body. There is a large roughly triangular spot almost black in colour situated immediately behind the upper end of the operculum. Width of this spot about two-thirds the diameter of the eye. The caudal fin has a yellow tinge and is crossed by several wavy lines of grey. The pectorals hyaline, the remaining fins being irregularly marked with grey. The operculum, preoperculum and a variable area below the pectorals have a silvery-white sheen.

Affinities.—This species appears to be allied to **S. albopunctatus** Temminck and Schlegel.

Described and figured from the type (*I.A. 2553* Aust. Mus.), 138 mm. long to the end of the middle caudal rays.

Locality.—Sir Edward Pellew Group, Gulf of Carpentaria, Australia. Coll. W. E. J. Paradice, June-November, 1923.

There are two specimens of this species captured at the same time from which the following notes have been made:—The smaller, length 91 mm., is the darker, having a ground colour of brownish-grey. White spots are present but less conspicuous than in the other specimens, whilst dark spots are more numerous and uniformly distributed over the body. The middle rays of the dorsals and ventrals project beyond the remainder, making these fins more pointed than in the other specimens. In the larger of these specimens, length 115 mm., the ground colour is similar but there are five evenly spaced transverse bands of a slightly darker colour than the intervening space. The white spots are as conspicuous as in the type, whilst the dark spots are more numerous than in the type but less numerous than in the smaller specimen. The shape of the dorsal and anal is intermediate between the other two specimens. The dark shoulder spot is equally conspicuous and of the same relative proportion in all three specimens. The transverse bands described in the middle-sized specimen can just be discerned in the type.

The following table gives some measurements and proportions from each specimen. All three specimens have the same fin formula.

—	Length to end of middle caudal rays.	Maximum depth.	Length of head.	Maximum diameter of eye.	Interorbital space.	Distance from anterior to posterior points of insertion of dorsal.	Ditto anal.	Max. depth in length.	Diam. of eye in head.	Interorbital space in head.	Anal in dorsal.	Head in length.
Type IA. 2553 ..	138	53	33	10	8·5	81	51	2·6	3·3	3.9	1·6	4·2
IA. 2554A ..	115	41	26	9	7·5	65·5	41	2·8	2·9	3·5	1·6	4·4
IA. 2554B ..	91	35	20	7	6	52	33·5	2·6	2·9	3·3	1·6	4·5

Family SOLEIDÆ.

Genus SYNAPTURA Cantor.

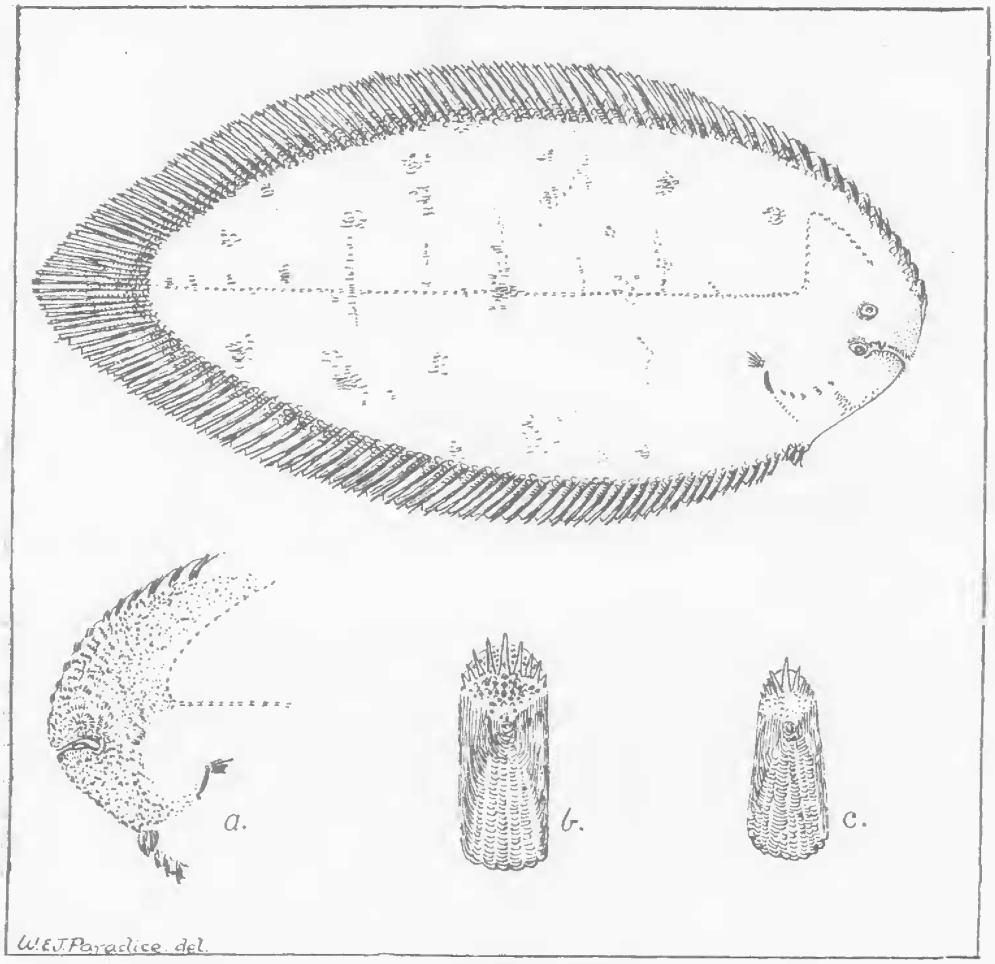
Synaptura setifer sp. nov. (Text-figure 3).

D. 70; A. 57; C. 14; P. 5; V. 3; L. Lat. 82; L. Tr. 36/36 (to the base of fin rays).

Greatest depth (54 mm.) at about two-fifths way from the snout to the hypural joint, 2.3 in the length from snout to hypural (123 mm.). Head (26 mm.) 4.8 in same. Eye (3 mm.) 8.6, interorbital space (4 mm.) 6.5, posterior dorsal and anal rays equal (15.5 mm.) 1.7, and middle caudal rays (20 mm.) 1.3 in length of head. Scales ctenoid above and below extending on to the fin rays, the pigmented scales of the upper surface being more markedly ctenoid than the unpigmented scales of the under surface. Head closely scaled above with tufts of cirri along the preopercular margin, and with small cirri evenly distributed over the area surrounding the mouth. Lower surface closely covered with cirri continuing over a crescent area extending dorsally to the seventeenth dorsal ray and ventrally to the ventral fins and gill slit. Small cirri on the lower profile from mouth two-thirds way down to the ventral fin.

Eyes, on the right side, small, raised above the head and separated by a scaly interorbital space. The upper eye well in advance of the lower, its distance from the snout being one and one-half times the interorbital space. The upper anterior nostril is the only conspicuous one, it being in a simple tube immediately in front of a transverse line through the anterior margin of the upper eye. (The specimen is so hardened by formalin that the interior of the mouth cannot satisfactorily be examined, but it can be determined that no teeth of any size are present.) Mouth opening backwards to

below the centre of the lower eye and completely surrounded by cirri. Gill slit small, somewhat tubular, situated antero-inferiorly to the pectoral fins, the gill slit and pectoral fin of the under surface being larger than the corresponding structures of the upper surface.



Text-figure 3.—*Synaptura setifer*, sp. nov.
Above: Figure of holotype (123 mm. from snout to hypural).
Below: *a*. Anterior portion of under surface showing distribution of cirri.
b. A scale from the middle of upper surface.
c. A scale from middle of under surface.

Dorsal fin commencing at the point of the snout just below a line drawn forward through the anterior eye. The rays increase regularly in length backwards and project a little beyond the membrane. Anal of similar form to dorsal, caudal obtusely pointed. Ventrals opposite each other and free from anal, the right being larger than the left. Lateral line straight from

the back of the head to the middle caudal ray and is situated slightly nearer to the dorsal than the anal. On the upper side the lateral line runs from the anterior end of its long limb, transversely towards the dorsal fin and then follows the dorsal curvature forward to above the anterior eye.

Colour.—Dark-brown above with patches of black cirri or setæ scattered irregularly, those near the lateral line being arranged in transverse lines. Below, greyish-white after preservation in formalin.

Locality.—Port Darwin, Northern Territory, Australia. Coll. Surgeon-Lieut. K. E. F. D. Hudson, 1925.

Family SCARIDÆ.

Genus SCARUS Forskal.

Scarus pyrrostethus australianus subsp. nov. (Plate XIV.)

D. ix./10; A. ii./9; P. 14; V. i./5; C. 13; L. Lat. 25; L. Tr. 2/1/6.

Head 3.5 in length to end of middle caudal ray; depth 3.2 in same; eye 5.8 in head; snout 2.8 in same; interorbital 3 in same. Body moderately deep and stout, profile convex both dorsally and ventrally, steeper anteriorly than posteriorly being steepest of all from the origin of the dorsal to the snout. Snout rounded, its tip slightly in advance of the mouth. Jaws unequal, the lower included. Teeth white; posterior canine present in the upper jaw. Upper lip double, the inner flap extending almost to the mid line. Upper lip covers more than half the dental plate; lower lip narrower, barely covering half the dental plate. Cheek with two complete rows of scales and two or three scales in the third row. Preopercle naked over anterior portion of the lower limb; opercle scaly. Six scales on middle line in front of dorsal. Lateral line interrupted, upper portion ending under last dorsal ray; lower portion commencing two rows of scales in advance of this and two rows lower down. The upper portion follows the dorsal curvature, the lower portion running in a straight line to the middle caudal. The tubes of the anterior portion are branched, the posterior tubes being practically simple.

Dorsal spines flexible, with their extremities markedly thickened and bent posteriorly to approximate the thickened portion of the next spine. From each spine thickened bands of membrane resembling rays run posteriorly to the thickened portion of the next spine. Soft dorsal and anal similar in form but not in colour marking. Caudal markedly lunate, the outer rays markedly produced, the upper more so than the lower. Ventrals fairly long, about two in the head, pectorals longer about 1.4 in the head, the posterior edge slightly and evenly curved and the upper rays not produced.

Colours.—Ground colour green fading to dirty white ventrally and brownish-green on the nape and snout. The scales in the region of the middle of the body have a reddish-brown central area, those immediately in front

and behind this having a corresponding central area of yellowish tinge. The scales in the vicinity of the caudal have an underlying pinkish tinge continuous with two conspicuous pink para-lateral lines which traverse the caudal. These bands are sharply differentiated from the remainder of the caudal which is uniformly green. The dorsal is pink with darker rays. A narrow band of blue runs the full length of the dorsal forming the margin of the soft portion but having an extremely narrow edge of white outside it in the spinous portion. (There is no blue band along the base of the dorsal.) The anal has two bright blue bands, one along the edge and the other along the base, the remainder of the fin being pink. The pectoral is blue over its upper third, fading to hyaline below. It has a bright yellow spot at its base. The ventral is white tipped with blue. Eye yellow. A blue supra-orbital band extends from a short distance anterior to the eye half way back to the origin of the lateral line. An infra-orbital line of blue about the same length lies equally before and behind the eye, whilst a median blue line runs from the posterior border of the orbit half way to the opercular angle. The upper lip has a white margin to its central half with a broad blue band above it reaching from one notch of the upper lip to the other. The lower lip has a central blue spot and a blue band on each side from the extreme angle of each side of the mouth to a point a little lateral to the blue spot and forming a chord to the notch in the upper lip. Below this is a slightly waved blue line reaching to slightly behind the angle of the mouth on each side. The area between these lower blue markings is yellow.

This new subspecies is a more brilliantly coloured fish than **S. pyrrostethus** Rich. and is more robustly built, as the following proportions indicate :—

	Scarus pyrrostethus Rich.	*Scarus pyrrostethus australianus*, subsp. nov.
Depth in length	3·5	3·2
Least depth of caudal peduncle in length	8·9	8·8
Head in depth	1	1·1
Pectoral in length	5·3	4·7

I have examined all the fish of the genus **Scarus** in the Australian Museum and note that different species have different degrees of thickening of the tips of the dorsal spines. Among the small number of fish available this character did not vary within a given species, the most marked thickening occurring in the two specimens of **S. pyrrostethus** Rich., with the exception of the type of this subspecies, in which the thickening is much more marked.

The specimen of **S. pyrrostethus** Rich. obtained at Pellew has been compared with the holotype of the new subspecies and the points of differentiation are set out in the following key :—

A. Caudal emarginate, the upper and lower rays hardly produced ; superior and inferior para-marginal pinkish bands inconspicuous. Dorsal with a median row of spots and an upper and lower bluish band. Dorsal spines moderately thickened at their tips, separate one from another. Blue band of lower lip united with the infraorbital band ; band of upper lip produced backward to eye. Posterior canines not differentiated.
Scarus pyrrostethus pyrrostethus ; IA. 1492. Pellew.

AA. Caudal lobes markedly produced ; para-marginal pinkish bands conspicuous. Dorsal with a distal band of bluish, but without spots and without proximal bluish band. Dorsal spines noticeably thickened at their tips, which approximate one another. Blue band of lower lip separate from the infraorbital one ; band of upper lip not produced beyond the mouth. Posterior canines well developed .. *Scarus pyrrostethus australianus* ; IA. 1669. C. Wessel.

Described and figured from the holotype 265 mm. to the end of the middle caudal ray.

Locality.—Cape Wessel, Northern Territory, Australia. Coll. W. E. J. Paradice, 1923.

Family TETRAODONTIDÆ.

Genus SPHEROIDES, Dumeril.

Spheroides whitleyi* sp. nov. (Plate XV.)

D. 8 ; A. 6 ; P. 13 ; C. 8.

Head, from upper lip to upper end of gill-opening (26 mm.), 2.8 in the length from upper lip to base of caudal (74 mm.). Eye (6 mm.), 4.3 in the head. Snout, from middle of upper lip to anterior margin of eye (14 mm.), 1.9 in the head, and a little more than the interorbital space. The interorbital space as here measured includes the pigmented skin over the dorsal aspect of the eye and is three times the distance between the bony edges of the orbit (4 mm.).

Longest dorsal ray (13 mm.), longest anal ray (12 mm.), longest pectoral ray (13.5 mm.), 2, 2.1, and 1.9 in the head. Median caudal rays (18 mm.), 1.4 in same. Least depth of caudal peduncle (6.5 mm.), a little greater than the diameter of the eye.

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* Named for G. P. Whitley of the Australian Museum, whose work in identifying the fish of the "Geranium" collection has made it possible to publish the paper in its present form.—W.E.J.P.

Chin receding from jaws, its depth equal to the diameter of the eye. Nostrils opening on either side of a papilla which is placed in a depression. Eye nearer the gill-openings than the end of the snout, its upper margin raised above the cephalic profile, lower lid free, upper adnate to the ocular membrane. Margins of gill-openings entire, the inner flap concealed.

Skin of the back from between the eyes to the dorsal fin and laterally down to a line joining the dorsal fin to the upper end of the gill-openings, covered with coarse spinules—snout and cheeks bearing fewer and smaller spinules. A few spinules occur behind the pectoral fins. Abdomen spiny from behind the chin to just before the vent, the skin of this area being longitudinally plicated, the skin elsewhere smooth. A definite fold extends from the chin to the base of the caudal passing immediately below the insertion of the pectorals. Dorsal and anal pointed, the origin of the former in advance of the latter. The four medial caudal rays equal in length and a little longer than the lateral rays; caudal truncate; upper pectoral rays longest, the margin rounded.

Colours.—Back marbled in light and dark brown, a line of about seven large almost circular spots of dark-brown extending along the sides from the upper end of the gill-opening to the caudal. The diameter of the largest spots approx. half the diameter of the eye. Lower surface white. A yellow zone extends along the lateral fold immediately above from the chin to below the origin of the dorsal. Fins hyaline with a tinge of yellow.

Affinities.—Allied to **S. alboplumbeus** Rich. and **S. hypselogeneion** Blkr.

Locality.—Port Denison, Queensland.

A smaller specimen appears in the "Geranium" collection from Sir Edward Pellew Group but is not as well preserved as the Queensland specimen figured and described. The smaller specimen has slightly more spinules behind the pectoral fins, and differs in colour from the larger, having black marbling and spots instead of brown. Its measurements taken in the same manner as those given for the type specimen are as follows:—

Length from upper lip to base of caudal 61 mm., head 22 mm., eye 5 mm., interorbital space 9 mm., least distance between bony margins of orbits 3.5 mm., snout 11 mm., longest dorsal, anal, and pectoral rays 11.9 and 11 mm. respectively. Middle caudal rays 15 mm., least depth of caudal peduncle 5 mm.

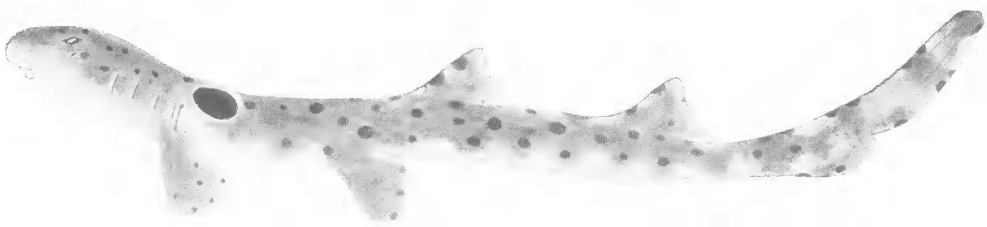

Fig. 1.—*Chiloscyllium ocellatum* Bonnaterre.

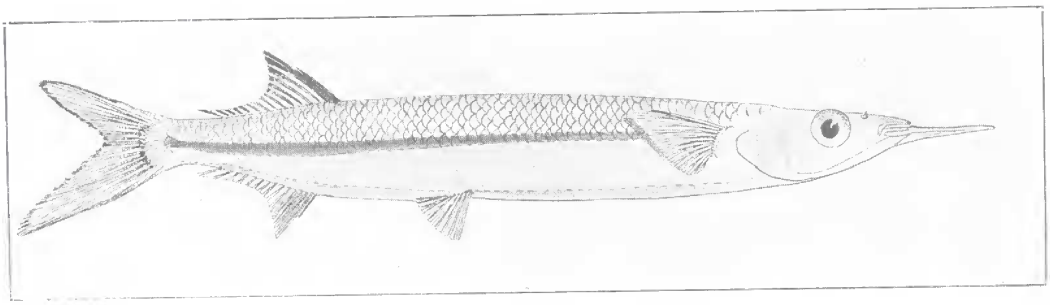

Fig. 2.—*Hemirhampus quoyi* C. & V.

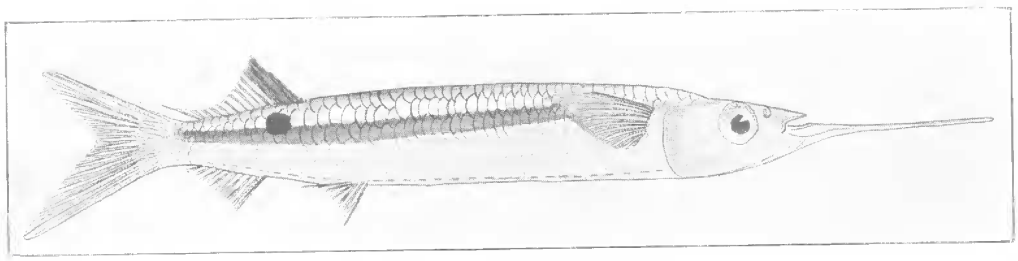

Fig. 3.—*Hemirhampus welsbyi* Ogilby.

W. E. J. Paradice, del.

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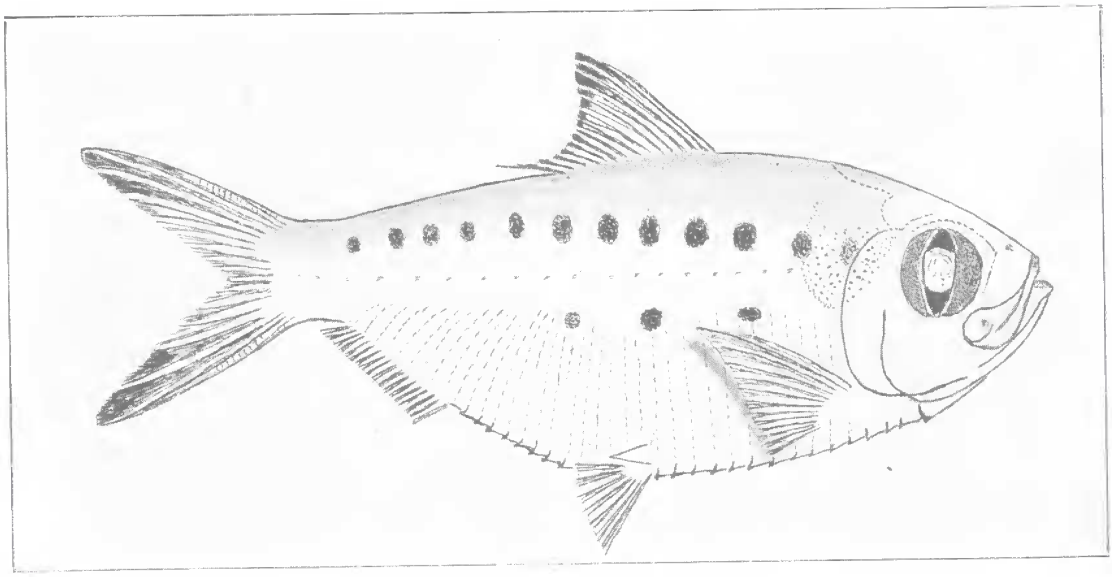

Fig. 1.—*Harengula kanagurta* Bleeker.

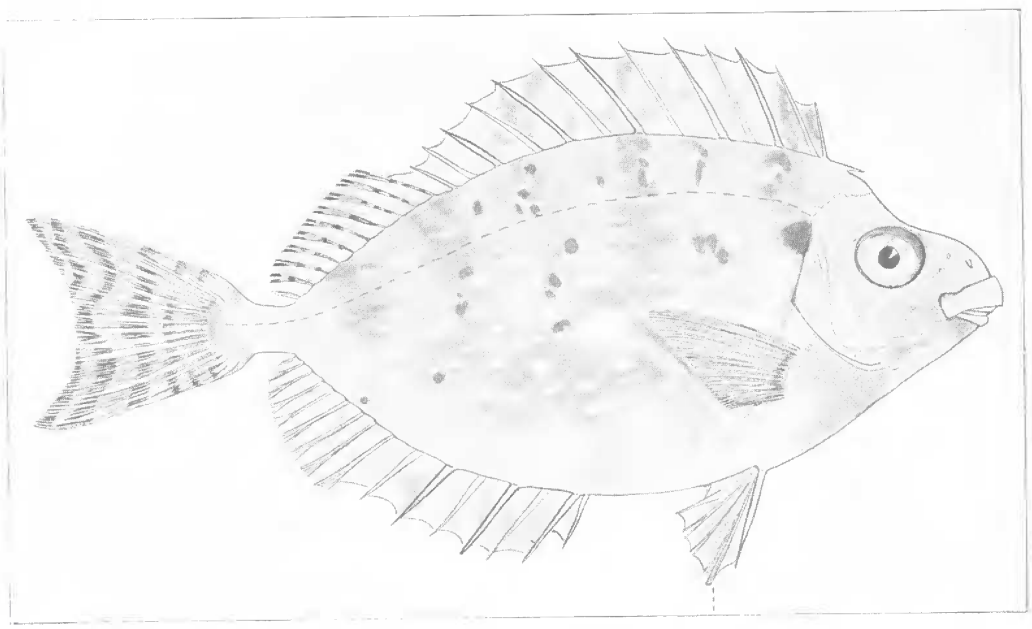

Fig. 2.—*Siganus concavocephalus*, sp. nov.

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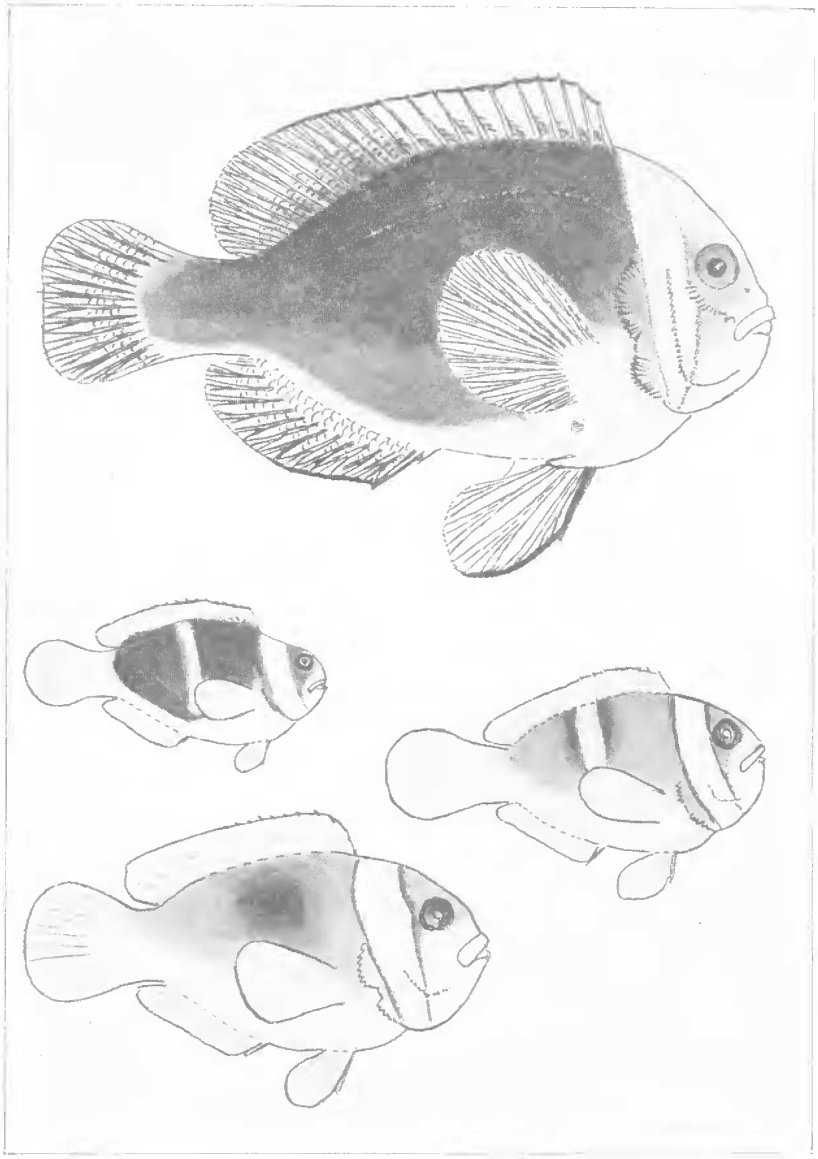

Amphiprion tricolor, Gunther. (Natural size.)

Above.—Figure of a specimen 98 mm. from end of snout to end of middle caudal ray.

Below.—Three sketches of specimens 41, 52, and 63 mm. in length, showing variation of colour markings with growth.

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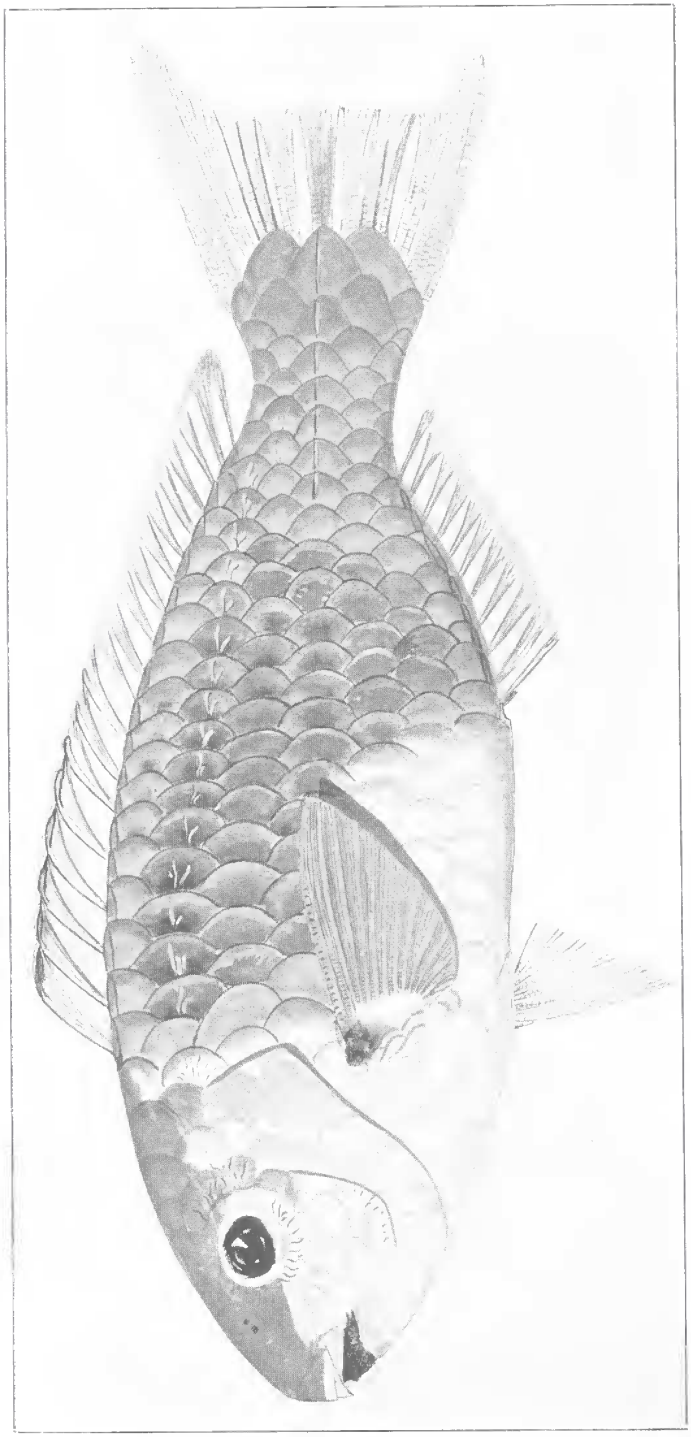

Scarus pyrrostethus australianus subsp. nov.

W. E. J. Paradice, del.

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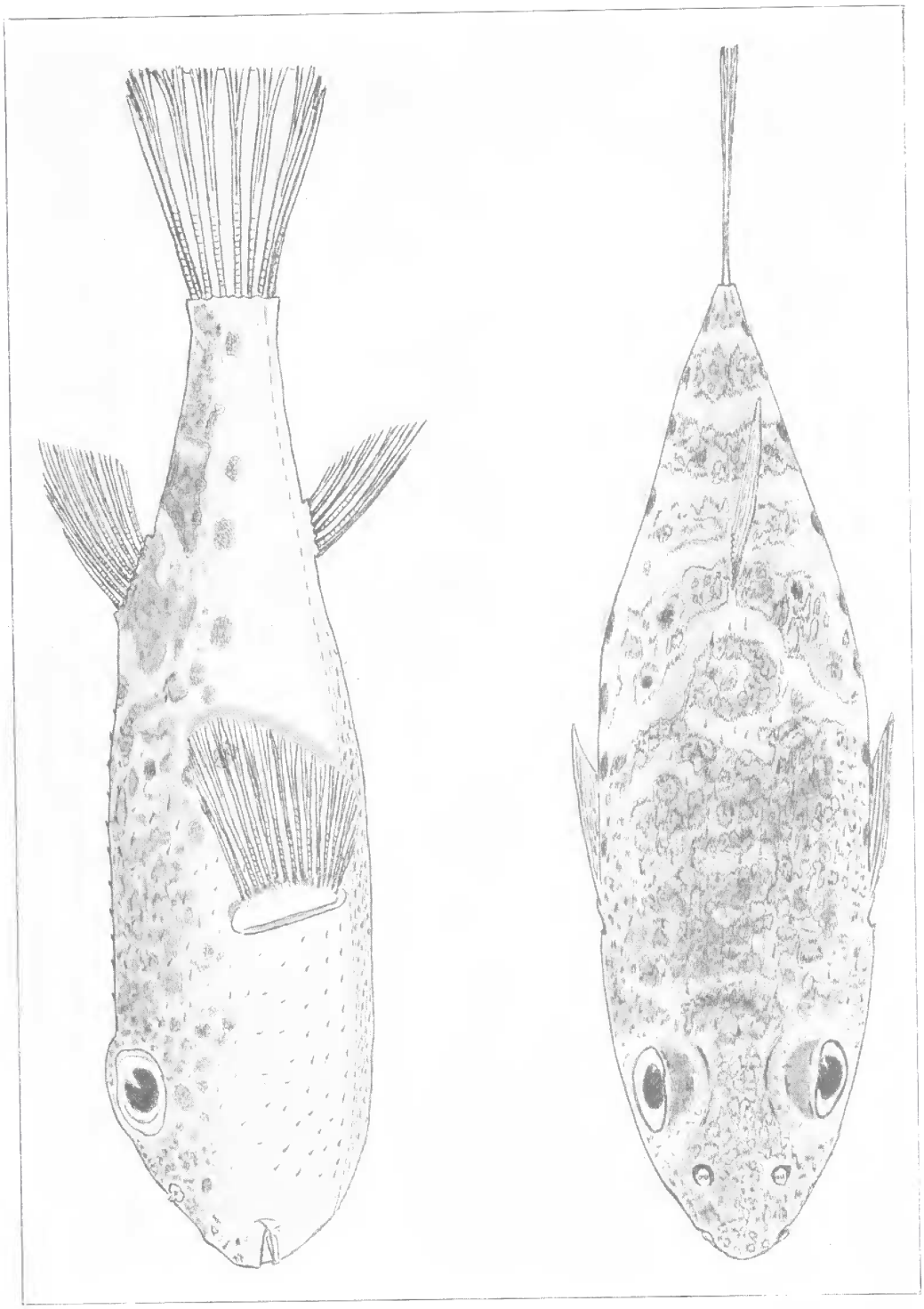

Sphcroides whitleyi, sp. nov.

W. E. J. Paradice, del.

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